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ABSTRACT

A program designed to teach the medical vocabulary required of tumor registrars was developed and administered to 33 persons, 31 of whom were employed at 25 Louisiana hospitals. The training program was administered as a correspondence course covering such topics as the purposes of a tumor registry and how the registry is established; how to code information contained on a tumor registry; and how to abstract the chart of a cancer patient. Criterion test score results showed that on 8 of 10 criterion tests, at least 75 percent of the students scored 65 or higher. The methods described in the report can be used in developing and field-testing draft training program materials in many different subject areas. (Author)

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The Development and Evaluation of A Correspondence Training Program for Tumor Registrars

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16. Abstracts

A program designed to teach the medical vocabulary required of tumor registrars was developed and administered to 33 persons, 31 of whom were employed at 25 Louisiana hospitals. The training program was administered as a correspondence course covering such topics as the purposes of a tumor registry and how the registry is established; how to code information contained on a tumor registry; and how to abstract the chart of a cancer patient. Criterion test score results showed that on 8 of 10 criterion tests, at least 75% of the students scored 65 or higher. The methods described in this report can be used in developing and field-testing draft training program materials in many different subject areas.

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FOREWORD

This report describes the development and testing of a self-instructional training program for teaching tumor registrars the procedures for abstracting the medical charts of cancer patients. The program is designed for use with high school graduates with no previous medically related experience.

Development of the program was sponsored by the Louisiana Regional Medical Program, Joseph F. Sabatier, M.D., Director. Project approval was received in 1969. Work began on program development in the Spring of 1970; testing of the program was completed in February 1972.

The prime contractor for the project was the Tumor Registry of Charity Hospital, New Orleans, Louisiana. This registry is under the supervision of Edward Krementz, M.D., Chairman of the Tumor Registry Board, and Head, Section of Oncology, Tulane University Medical School. The Charity Hospital registry is a participant in the End Results Evaluation Program, a program sponsored and supported in part by the National Cancer Institute, U.S. Department of Health, Education and Welfare (DHEW).

The technical consultant for the program was Robert F. Ryan, M.D., Professor, and Head, Section of Plastic Surgery, Tulane University Medical School. Dr. Ryan technically reviewed the training material developed for the program. In addition, he supervised the establishment of project facilities in New Orleans, provided guidance for the design and development of the program, and guided program coordination with the Louisiana Regional Medical Program and the End Results Section of the National Cancer Institute, and with other tumor registries in the United States.

Considerable technical support in the form of reviews of draft instructional material and material for the Tumor Registrar Handbook was provided by Miss Brent S. Robertson and Mrs. Jane Roberts, Director and Computer Liaison respectively of the Charity Hospital Tumor Registry.

Development and test of the program was coordinated by Mr. C.O. Renick, Jr. Mr. Renick coordinated contractor and subcontractor activities in the New Orleans area. In addition he gathered background information and training chart material for the program; coordinated review of the instructional material; administered the program during its initial field test; maintained project records, prepared progress reports, and so on.

Much of the instructional material was developed by the Human Resources Research Organization, the subcontractor for the project. When appropriate, explanatory material was taken from the "End Results Group 1967 Code Manual" prepared by the End Results Section, National Cancer Institute. Additional explanatory material was obtained from the Procedures Manual for Cancer Registries of the Georgia Regional Medical Program and from the California Tumor Registry Handbook.

The course was designed and developed under the technical direction of C. Dennis Fink, Ph.D., Program Director, HumRRO Division No. 1 (now the Eastern Division), Alexandria, Virginia. Dr. Fink prepared considerable portions of the course material, assisted by Richard D. Behringer, Ph.D., and Mrs. Judith C. Pumphrey. Dr. Behringer prepared most of the material for Instructional Packages 6 and 7, which deal with the procedures for describing the extent of disease of a malignant tumor. Mrs. Pumphrey coordinated the many activities associated with the editorial review and assemblage of the course instructional packages.

In addition to the support and encouragement provided by the Louisiana Regional Medical Program, technical assistance, counsel, and information were provided by persons

associated with the Regional Medical Programs Service, Health Services and Mental Health Administration (DHEW); the End Results Section, National Cancer Institute, National Institutes of Health, DHEW; the Rocky Mountain States Cooperative Tumor Registry, Salt Lake City, Utah; the Tumor Registry Training Program, Cancer Research Institute, University of California, San Francisco; the Georgia Regional Medical Program; and individuals associated with tumor registries in the Washington, D.C. area, New York City area, and the State of Louisiana.

Funds for revising the draft program on the basis of its initial field-test were not forthcoming because emphasis in the Regional Medical Program was shifted away from cancer-related activities. Therefore, the draft program as discussed herein *is not available for distribution.* This report has been published because it contains methodological information of interest to anyone who might wish to develop and field-test draft training program material.

Meredith P. Crawford
President
Human Resources Research Organization

SUMMARY AND CONCLUSIONS

PROBLEM

The training program described herein was developed in part because of the desire of the Louisiana Regional Medical Program to promote the establishment of a state-wide registry system within the state of Louisiana. A major impediment to the establishment of this system was the lack of a suitable training program for tumor registrars. Until the development of the present program, tumor registrars and their assistants were trained by traditional lecture and workshop techniques and by on-the-job training. Instruction often was provided by medical doctors who seldom had much time to devote to the training of tumor registrars.

Tumor registrars often are operated by persons who have received little or no previous training in a medically related area. These persons must learn the medical vocabulary associated with the diagnosis and treatment of cancer. In addition, they must learn a fairly complicated set of rules for abstracting the medical chart of a cancer patient.

APPROACH TO COURSE DESIGN

The original intent in developing this training program was to teach the medical vocabulary required of tumor registrars. The program as eventually constructed included the teaching of the abstracting and coding procedures developed by the End Results Section, National Cancer Institute.

The training program was designed to be completely self-contained and to be administered as a correspondence course. The instructional material was contained in ten instructional packages. Each package contained a criterion examination. Distributed with certain instructional packages were reference aids and job aids judged to be critical to the successful performance of a tumor registrar. Extensive use was made of self-scoring practical exercises during which a student abstracted from all or portions of 15 training medical charts which were distributed with the program. The student was provided with a Tumor Registrar Handbook containing a variety of job aids of use to a tumor registrar. The use of these job aids was taught during the program.

Some of the major topics taught in the program include the purposes and products of a tumor registry, the procedures for establishing a tumor registry, general procedures for coding information contained on a tumor registry abstract, the general types of files established and maintained by a tumor registry, and the detailed procedures for abstracting the chart of a cancer patient. Various sections of the program concentrated on teaching the medical vocabulary required to abstract the medical chart of a cancer patient. A general overview of 13 body systems was provided, with emphasis placed on learning the location of the various parts and organs that comprise each system.

TRAINING PROGRAM TRYOUT AND EVALUATION

The program was administered to 33 persons, 31 of whom were employed at 25 hospitals located throughout the state of Louisiana. Two students were employees of the Louisiana Blue Cross. Most of these students were not familiar with the operation of a tumor registry. Many were persons who work in the Records Department of a hospital,

but who were quite unfamiliar with the vocabulary associated with the diagnosis and treatment of cancer. Twenty-five students received a payment of $500 for taking the course; these students provided comments and suggestions regarding how the course could be improved.

The training program was evaluated in terms of the criterion test scores for each of the ten instructional packages. The results showed that on eight of ten criterion tests, at least 75% of the students obtained a score of 65 or higher. The criterion test scores for two instructional packages were, on the average, lower than desirable; examination of student comments and discussions with the students revealed that these low criterion test scores were due primarily to the use of an unusually difficult training chart in these tests. The average student required 145 hours to complete the training program.

CONCLUSIONS AND RECOMMENDATIONS

The training program, in its present form, was judged to be effective. It can teach persons with little or no medical training to abstract the medical chart of a cancer patient in accordance with abstracting/coding rules promulgated by the End Results Group of the National Cancer Institute.

However, additional work is recommended before the program is released for general availability. It is recommended that:

- Improved material be developed for those portions of the program that, as indicated by criterion test scores, had instructional inadequacies.
- The program be reviewed by a select group of persons knowledgeable with respect to End Results Group abstracting procedures in order to fully assure that the program is in accordance with these procedures.
- The program be reviewed by agencies such as the American Cancer Society and the American College of Surgeons in order to ensure its widespread acceptability within the medical community.
- A final version of the training program be prepared, incorporating the recommendations of the various review committees and instructional improvements as suggested by students of the experimental version of the program.
- The training program be made available throughout the United States.

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The Development and Evaluation of A Correspondence Training Program for Tumor Registrars

Chapter 1

REQUIREMENTS FOR AND OBJECTIVES OF THE TUMOR REGISTRAR TRAINING PROGRAM

TRAINING REQUIREMENTS FOR A TUMOR REGISTRAR

A considerable portion of the existing information on incidence of cancer and on the effects of various types of treatment for cancer is based on data obtained from tumor registries. Most tumor registries are located at individual hospitals. About 900 registries currently exist in the United States. The major activities conducted at these registries include abstracting the medical chart of a cancer patient, determining the post treatment status of former patients, providing assistance to help ensure the periodic checkup of former patients, and preparing statistical reports based on tumor registry data.

Most registries exist for the purpose of providing information to the physicians who practice at a particular hospital. Within some states, counties, and geographical regions, individual registries have been organized into registry systems. These systems have been supported, at least in part, by the Regional Medical Program Services (RMPS), a division of the Health Services and Mental Health Administration. A small number of individual registries and state registry systems are supported in part by the End Results Section (ERS) of the National Cancer Institute (NCI). These registries and registry systems provide data to the NCI for epidemiological research purposes.

A tumor registry is operated by a tumor registrar. At large registries the registrar is assisted by one or more abstractors, coding clerks, and patient follow-through clerks. The tumor registrar may have received training as a medical records librarian or as a medical secretary, or may have an AA or BA degree in one of the biological sciences. It is quite common, however, for a registrar to have received no formal biological or medical training; assistants are even less likely to have had such training.

Tumor registrars and their assistants have customarily been trained by traditional lecture and workshop techniques and by on-the-job training. Instruction generally was provided by medical doctors who seldom had much time to devote to training registry personnel.

The only formal training program in existence as of January 1972 is that operated by the Tumor Registry, Cancer Research Institute, University of California, San Francisco. The training program is primarily suited to persons who already have some experience at operating a tumor registry. Trainees are required to live at the training site from one to four weeks. The enrollment capacity for the program is limited; in addition, few hospitals are able, or willing, to provide the funds to support their tumor registry personnel while away on a training assignment.

The training program described in this report was developed in part because of the desire of the Louisiana Regional Medical Program to promote the establishment of a statewide registry system within the State of Louisiana. A major impediment to the establishment of such a system was the lack of a suitable training program for tumor registrars. A survey of hospital personnel and conditions within the state indicated that procedures would have to be developed for training persons employed at small hospitals located throughout the state, much of this training would have no close monitoring, and the training would have to take place at the trainees' work site or in their home setting.

These were the major reasons for supporting the development of a self-instructional training program, similar to a correspondence course, for tumor registrars.

OBJECTIVES OF THE TUMOR REGISTRAR TRAINING PROGRAM

The original goal of the training program was to teach the medical vocabulary required of tumor registrars. Early in the development of the program, it was decided to expand the intent to include and to emphasize the teaching of the End Results Group (ERG) abstracting/coding procedures. These procedures are employed at registries supported in part by the End Results Section, National Cancer Institute.

A training program must distinguish between activities which the trainee will be taught to perform at a journeyman level of proficiency and activities with which the trainee will be *familiarized*. This latter set of activities includes those which the trainee is told about, and may even acquire considerable knowledge about, but still cannot perform skillfully. In the present training program those activities taught to at least *a minimally acceptable* level of proficiency included:

(1) The identification and selection of charts that should be incorporated into tumor registry files.
(2) The preparation of tumor registry abstracts in accordance with End Results Group procedures.
(3) The proper utilization of a small number of standard references and job aids judged to be critical to the satisfactory performance of a tumor registrar.
(4) The preparation of a follow-through record for present and former cancer patients.
(5) The ability to satisfactorily define and/or utilize the standard medical vocabulary and abbreviations found in the chart of a cancer patient.

It should be emphasized that the training goal of this program is to prepare students so that they can *apply* ERG abstracting procedures to the filling out of a tumor registry abstract form. During the instruction many abstracting rules and procedures are memorized by the student. However, the goal is not to train a student to the point where all these rules are memorized but to emphasize using the Instructional Material for reference. The training goal, therefore, is to prepare students who can reliably and accurately abstract a medical chart by using the Instructional Package material and other reference aids provided during the course.

The training program that was developed introduced the trainee to practically all of the purposes, activities, and potential products of a tumor registry. In many instances these were discussed within the self-instructional packages. In other instances the trainees were provided with reference articles dealing with some aspect of the establishment or operation of a tumor registry. Some of the more important topics to which the trainees were introduced were:

(1) The purposes of a tumor registry.
(2) The products of a tumor registry.
(3) The procedures for establishing a tumor registry.
(4) The general procedures for coding information contained in a tumor registry abstract.
(5) The general types of files established and maintained by a tumor registry.

Chapter 2

GENERAL CHARACTERISTICS OF THE TUMOR REGISTRAR TRAINING PROGRAM

TRAINING PROGRAM FORMAT

The training program was designed to be completely self-contained and to be administered as a correspondence course. One of the basic features of a correspondence course is that it contains examinations that can be returned to a central location for scoring, with answers and comments returned to the student with the next block of instructional material. If desired, such procedures can be carried on within an individual hospital; that is, a member of the hospital staff can be assigned to administer the correspondence course, score the examinations with a scoring key prepared for the program, and return the scored examination, with appropriate comments, to the student with the next instructional package.

The basic characteristics of the tumor registrar training program are as follows:

(1) The instructional material is contained in 10 instructional packages. Each package contains an appropriate criterion examination. (The table of contents for Instructional Package #1 is contained in Appendix A of this report.)

(2) Reference aids and job aids judged to be critical to successful job performance are distributed with certain instructional packages. Portions of the instructional packages are designed to teach the proper use of these job aids.

(3) Portions of the instructional material, especially on medical vocabulary, are presented in a programed instructional format. Other blocks of instruction present fairly large chunks of instructional material followed by one or more practical exercises.

(4) All programed instructional material is in a linear format. That is, no attempt is made to return the student to remedial blocks of instructional material when the student makes an error. Some of the procedures employed to correct student errors are discussed later in this report.

(5) Extensive use is made of self-scoring practical exercises. With most of these exercises, instructional comments provide additional information to the students on applying the abstracting rules taught during the program. The use of a standard set of instructional comments is one technique for providing information to correct potential student errors.

(6) Most of the practical exercises are specifically related to filling in one or more items on the detailed tumor registry abstract developed for the program.

(7) The student is provided with a Tumor Registrar Handbook containing a variety of job aids. The use of these job aids is taught during the program.

(8) Fifteen separate medical charts are distributed with the training program. Most of these charts are complete copies of medical charts selected from Charity Hospital, New Orleans. Patient and doctor identification has been removed from these training charts, and in some instances fake patient identification has been substituted.

TECHNIQUES FOR EVALUATING STUDENT PERFORMANCE

The training program makes extensive use of two general types of student evaluation procedures—self-diagnostic tests for use by the students and criterion tests that are scored and evaluated by a program coordinator.

One of the key characteristics of programed instruction is that it continually provides trainees with a means for assessing their own performance. In the present program, a short block of instructional material is followed by a question that requires the student to demonstrate an understanding of the material. The student compares his answer with a *correct* answer given in some easy-to-find location in the instructional package. When he cannot answer the questions correctly, the student is instructed to restudy appropriate portions of the instruction. With this technique, the student is continually informed of his progress in the course.

The training program makes extensive use of practical exercises located at the end of major blocks of instruction. Many of these exercises require the student to abstract portions of a medical chart of a specific diagnostic or treatment report. Answers, plus instructional comments for the practical exercises, are located in a separate section of each instructional package. The use of self-corrected practical exercises provides the student with a means for evaluating his response to each exercise. This instructional procedure is especially useful for indicating to the student his ability to apply what he has just learned.

The criterion test developed for each instructional package is scored by a program coordinator. For each question a correct answer was prepared along with comments explaining why certain portions of each answer should have been prepared in a certain way. These instructional comments provide a review of material previously presented. In addition, they help the student generalize the instructional material to abstracting situations that may be difficult to handle.

The criterion test answers prepared by the trainees, and the correct answers and instructional comments pertaining to the test questions, are returned to the trainee. This provides another means for each student to assess his ability to appropriately abstract medical charts.

TECHNIQUES FOR EVALUATING PROGRAM EFFECTIVENESS

During the development of a training program, not only the performance of the experimental student but the program itself must be evaluated. In fact, for a new program it is more important to evaluate the program itself. The present training program was extensively evaluated by the students, and by the program developers and the technical consultants. Before the program is prepared in final form, it should be evaluated by a selected group of reviewers.

Student Evaluation of the Program

Twenty-five of the trainees of this experimental program received a stipend of $500. For this payment they were asked to record in detail their comments on any portions of the program that they found difficult or confusing. These comments will be used to identify portions of the program in need of modification.

Student comments covered such topics as:

- Spelling errors and missing material.
- Instructional material that was difficult to comprehend.
- Instructional material that seemed to conflict with material presented in other sections of the program.
- Confusing/inappropriate illustrations and practical exercises.
- Disagreements regarding answers to practical exercises and criterion test questions.
- Practical exercise material that was illegible, generally because of difficulty in reproducing chart material.

- Time required to study each section of an instructional package.
- Time required to complete each section of a criterion test.

The primary goal of a training program should be to produce graduates who can perform satisfactorily. The program should be for the benefit of the student, designed to shape student behavior expeditiously and straightforwardly. It is quite appropriate, therefore, to allow the student considerable say in identifying those portions of the program in need of revision. The trainees of the present program did provide a wide variety of comments that should prove useful for improving the instructional material.

Use of Criterion Test Scores For Program Evaluations

On the criterion test developed for each of the 10 instructional packages, student answers were forwarded to the project coordinator who scored the test, evaluated the performance of each student, and returned the examinations, with appropriate comments, to the student. With respect to the end performance of the students, a program can be judged successful if the students can perform satisfactorily on an appropriate criterion test.

For this training program the final behavior of the trainees can be specified quite accurately—it is to abstract the medical chart of a cancer patient in accordance with End Result Group abstracting/coding procedures. A considerable portion of the criterion test questions are designed to assess whether the student can correctly complete certain portions of a tumor registry abstract. It is appropriate, therefore, to regard the training program as a success to the extent that it prepares trainees to abstract a medical chart successfully. The criterion test results will be presented later in this report. It will suffice to say at this point that these results indicate that the training program is successful.

Evaluation by Technical Experts

This training program must be evaluated, in part, in terms of whether the instructional points and abstracting procedures taught during the program are judged to be in agreement with those promulgated by the End Results Group of the National Cancer Institute. The program was developed and reviewed by the consultants in accordance with this general requirement. It is rarely possible, however, to develop a completely satisfactory first draft of a training program.

The first draft of this program has been reviewed by prime contractor personnel to identify sections of the program that needed to be changed to improve medical accuracy or to agree more closely with ERG procedures. The second draft of the instructional program has been revised in accordance with the results of the above review. In particular, medically incorrect statements have been corrected.

There are, however, certain portions of the program that still need to be more closely examined to determine whether they are in agreement with the latest interpretation of ERG procedures. Also, it would be most appropriate if the program, before being printed in final form, were reviewed by interested agencies such as the American Cancer Society, the American College of Surgeons, and especially, the End Results Group. Suggestions provided by these reviewers then can be incorporated into the final training program.

TRAINING PROGRAM ADMINISTRATIVE PROCEDURES

The general procedures for administering the training program are as follows:

(1) Instructional Package 1 is forwarded to the trainee. This package contains instructions on how to study the instructional material, and on how to answer and then

return the criterion test to the Training Program Coordinator. It is suggested that the trainee take no more than two weeks to study the instructional material and return the criterion test. Preferably, the trainee will be given two-three hours per day, *during working hours*, for study.

(2) The criterion test is completed by the trainee and then returned to the program coordinator.

(3) The program coordinator scores the criterion test and returns it to the student along with a set of standard comments that explain the answers to the criterion test. These comments were developed as part of the instructional program.

(4) It takes 15 to 30 minutes to grade a single criterion test. More time would be required if comments are provided which are specifically related to each student's answers. This preferred commenting procedure is too time consuming when administering the course to large numbers of students.

(5) The next instructional package is forwarded to the trainee along with the answers and comments to the criterion test for the previous instructional package.

(6) This cycle continues until all instructional packages have been distributed to the trainees.

(7) The Tumor Registrar Handbook, along with appropriate tabs for the various Handbook sections, is distributed to the student with Instructional Package 1. Sections of the Handbook are sent out with the various instructional packages of the program. Each section of the material is distributed with the particular instructional package to which it first applies.

(8) Two complete training charts are distributed with the first seven instructional packages. One chart is distributed with Instructional Package 8.

The administration of a correspondence course can be quite complicated—there are many pieces of paper that must be forwarded to and returned by the trainee. Therefore as part of the course a detailed set of course administrative procedures was developed. The major topics covered in this course administrative manual included:

(1) Distribution of instructional packages.
(2) Distribution of reference aids and handbook material.
(3) Probable time required to study each instructional package.
(4) Procedures for scoring criterion tests.
(5) Procedures for scoring practical exercises.
(6) Procedures for distributing, and sequence for distributing: (a) abstract forms; (b) training charts; and (c) handbook material.

PRODUCTS OF AND ANTICIPATED AUDIENCE FOR TUMOR REGISTRAR TRAINING PROGRAM

At the completion of the present project the following products had been produced in either draft or final form:

(1) A draft training program consisting of 10 self-instructional packages, each dealing with some aspect of the medical vocabulary and the rules required for abstracting the medical chart of a cancer patient.
(2) A draft version of a Tumor Registrar Handbook containing a manual of abstracting procedures plus other information of use to a tumor registrar.
(3) A draft version of a manual containing a classification scheme for extent of disease. This manual was developed from a scheme originally developed by Mrs. Paula Baylis and the End Results Group. It has been used in modified form by the California Tumor Registry System.

Chapter 3

PREPARATION OF PROGRAM AND SELECTION OF TRAINEES

SELECTION AND SEQUENCING OF COURSE CONTENT

The content of this program was selected so as to prepare persons to satisfactorily complete a tumor registry abstract form using End Results Group abstracting/coding procedures. Adoption of this general training objective meant that the course had to stress the application of ERG procedures, and had to teach the skills and knowledges required to fill in the specific items on a tumor registry abstract.

The tumor registry abstract developed for this program contains spaces for recording 50 items of information. (Section II of the abstract (Biographical/Social/Medical History) is shown in Appendix B.) These 50 items are divided into five categories dealing respectively with:

- Patient Identification
- Biographical/Social/Medical History
- Medical Information, Diagnostic and Physical Findings
- Treatment Information
- Patient Follow-Through Record

The instructional content of the course was selected so that a trainee would learn how to search through a medical chart to locate the information required to complete each of the five main sections of the tumor registry abstract. The critical skills and knowledges required to perform the abstracting activity are covered in detail in the program. These include:

(1) The capability to arrange the contents of a medical chart in chronological order, with similar items (history information, diagnostic information, doctor's orders, progress notes, etc.) grouped together.

(2) The knowledge of the type of information contained on each type of medical record report, sets of notes, and so forth and the skill to summarize this information in accordance with ERG procedures.

(3) The knowledge of a basic cancer-related medical vocabulary so that appropriate medical chart information can be identified and summarized, and in particular so that the difficult-to-read handwriting, typically found in a medical chart, can be comprehended.

(4) The capability to use tumor registry reference material so that decisions can reliably and accurately be made regarding what information should be recorded in the various blocks of the tumor registry abstract.

The general sequence for presenting the course content was as follows: The first two instructional packages contain a broad overview of the purposes, functions, activities, and products of a tumor registry. The purpose of this material is to provide the trainee with a broad context for understanding the detailed abstracting and patient follow-through rules presented in subsequent instructional packages. Also, the first two instructional packages are designed to provide the trainee with the information to answer the many general types of questions which lay persons ask about the diagnosis and treatment of cancer and about the purpose of a cancer registry.

Instructional Packages 3-9 teach abstracting activities in the sequence in which they are usually performed by a tumor registrar. During this instruction, the functional context approach to instructional sequencing is used. Essentially, this approach involves presenting instructional material at the time when it is first required in order to perform an activity.

A tumor registrar performs a number of tasks not directly related to abstracting a medical chart. Some of these are discussed in Instructional Package 10. In presenting this material, considerable use is made of outside references. Instructional Package 10 contains discussions of the general procedures for coding tumor registry abstracts, the general procedures for preparing tumor registry reports, and the general procedures for establishing and operating a tumor registry.

PREPARATION OF INSTRUCTIONAL MATERIAL: GENERAL APPROACH

Any job position has certain characteristics that either simplify or complicate the preparation of instructional material for that position. For the tumor registrar, abstracting activities are fairly well structured in that a specific and quite detailed abstract can be prepared. The nature of this abstract, particularly if it is in detail, defines quite precisely the nature of the abstracting activity and the related training program. A detailed abstract was developed for this program and this step greatly simplified the selection, sequencing, and preparation of the instructional material.

Various procedures and rules have been developed for abstracting and coding tumor registry information. The most sophisticated of these has been developed by the End Results Group of the National Cancer Institute. To use ERG coding procedures reliably, a medical chart has to be carefully abstracted to ensure that the abstract contains all the information required to select from among various coding category alternatives. The decision to teach ERG abstracting procedures meant that the training program had to teach procedures much more complicated than those used by many existing tumor registries. This decision was made because it was judged that ERG procedures are more useful than other sets of simpler procedures, and are the ones that should be employed at tumor registries—assuming that there is a feasible means for teaching the procedures to registry personnel.

The general procedures for preparing the instructional material first involved gathering and reviewing material that had already been prepared by other registries and by the ERG. Whenever possible, portions of this material were incorporated into the training program. Considerable use was made of material from the ERG Coding Manual of 1967. In numerous instances, additional material was prepared to further explain this "borrowed" material.

The initial rough draft of the instructional material was prepared by subcontractor personnel and reviewed for medical correctness by a technical consultant provided by the prime contractor (Charity Hospital, New Orleans, Tumor Registry). The material was then reviewed by the director and a key staff member of the Charity Hospital Tumor Registry who concentrated on identifying and suggesting rewrites for portions of the material in conflict with their interpretation of ERG procedures. This corrected material was then returned to the subcontractor. It was rewritten as suggested by the technical consultants and then underwent editorial review. The material then was printed, put in instructional packages, and forwarded to the Technical Monitor of the program.

When time permitted, the instructional material was presented to one or two senior high school students who studied the material and identified portions that were difficult for them to comprehend. These portions were then rewritten.

experimental program and asked whether they had one or more persons on their staff who wished to participate in the program. More than 60 persons asked to participate in the original program. Of those finally selected, all but one was associated with a medical care institution. Most of those selected were not familiar with the operation of a tumor registry.

Of the 33 experimental students, 32 had no formal medical training; 16 had worked in the records department of a hospital but never in a tumor registry, and 7 had worked in a tumor registry. Two of the students had a BA degree; all students had graduated from high school. All but one of the trainees were women, ranging in age from 17 to 57. It was judged that this group of trainees was typical of persons who might be available for employment as tumor registrars. Useable data were obtained from 31 of the 33 students.

PROGRAM ADMINISTRATION

The course was completely administered as a correspondence course to four groups of students. The first group began study of the program on 19 July 1971. At one- or two-week intervals, additional groups of students started study of the program. The first group of seven students met in New Orleans to initiate the program. They received a short briefing on the intent of the program.

Chapter 4

RESULTS AND EVALUATION OF THE TRAINING PROGRAM

This section contains a discussion of the results of the criterion tests, and the average time required by a student to study the instructional packages and to take the criterion tests. Table 1 summarizes the key findings for each of the instructional packages and for the training program as a whole.

CRITERION TEST RESULTS

For each of the ten criterion tests a scoring key was prepared. The maximum score for each criterion test was arranged to total 100 points. The scoring key and scoring instructions for each criterion test were incorporated into the course administrative manual. An attempt was made to be explicit enough so that persons with little cancer-related knowledges could score the test items.

Table 1 contains a summary of the criterion test scores for each instructional package. Some of the more important findings contained in Table 1 are as follows:

(1) Twenty-seven trainees (88%) scored 70 or above on eight of ten instructional package criterion tests.

(2) The highest overall criterion test scores were obtained for criterion tests 1 and 2.

(3) The lowest overall criterion test scores were obtained for criterion tests 3 and 10.

Table 1

Criterion Test Scores Obtained During Field Test of Tumor Registrar Training Program

(Maximum Score Per Criterion Test = 100; N = 31)

	Criterion Test									
	1	2	3	4	5	6	7	8	9	10
Median Score	88.8	86.5	71.8	74.3	71.5	73.6	70.9	81.0	70.9	62.5
1st Quartile Score	83.0	91.8	66.0	80.0	78.2	76.7	75.9	84.5	77.4	48.5
3rd Quartile Score	92.0	96.9	76.0	83.1	81.5	78.2	82.4	88.0	85.0	73.7
Range										
Minimum Score	68	77	62	57	57	68	55	74	56	25
Maximum Score	100	100	90	89	95	94	91	93	100	88
Percentage of Scores										
Below 70	3.2	0.0	38.6	6.4	19.3	3.2	12.9	0.0	22.5	60.9
Below 65	0.0	0.0	16.1	3.2	6.4	0.0	3.2	0.0	3.2	57.7

INTERPRETATION OF CRITERION TEST SCORES

Instructional Packages 1 and 2 dealt mostly with the general purposes and operations of a tumor registry. The criterion tests for these two packages did not contain questions involving the actual abstracting of medical chart material. It must be concluded, therefore, that the students had more difficulty on abstracting test items than on non-abstracting items. An analysis of the criterion test scores for the other Instructional Packages bears out this general conclusion.

Most students had special difficulty with the criterion test for Instructional Package 3. This was due primarily to their difficulty in organizing a medical chart, and to the use in the criterion test of a medical chart (Training Chart #6) that was very difficult to abstract. Comments provided by the students, as well as an analysis by the consultants and course developers, indicated that the students had been asked to organize an unusually difficult medical chart. There is also reason to believe that this particular task should be taught in a later portion of the training program; the students would then be familiar with the various sections of a medical chart and would be in a position to more easily learn how to organize these sections.

In Instructional Packages 3 and 4, the trainees were first introduced to the procedures for abstracting a medical chart. Most of the students were not too familiar with medical charts, and therefore had difficulty mastering the instructional points contained in these two instructional packages. In subsequent packages, this difficulty lessened, as reflected by a general increase in the criterion test scores. This seems to be simply a case of the student, with experience, acquiring increased facility at working with a medical chart.

The students scored especially poorly on the criterion test for Instructional Package 10. At least two reasons were identified to account for this poor performance. One of these, the use of Training Chart #6, has been discussed. A second contributing factor was that toward the end of the experimental training program 16 students had yet to complete criterion test 10. Moreover 9 of these students had not completed criterion test 9. These "tardy" students were contacted by the Project Coordinator and asked to complete the program as rapidly as possible. This request was successful in that all 16 students contacted did rapidly complete the program, but their criterion test scores suffered significantly.

(1) For those 15 students who completed the training program without special prodding:
- Their median score for criterion test 10 was 69.0
- Their scores ranged from 50 to 88.

(2) For those 16 students who completed the program after prodding:
- Their median score for criterion test 10 was 54.0.
- Their scores ranged from 25 to 80.

AVERAGE TIME TO STUDY INSTRUCTIONAL MATERIAL AND COMPLETE CRITERION TESTS

Table 2 shows the average time in hours and minutes to study each Instructional Package and to complete each criterion test. The two median times for each Instructional Package have been summed to obtain an estimate of the total time required to study and complete the test for each Instructional Package. The data in Table 2 indicate that:

(1) It took approximately *10 hours and 45 minutes*, on the average, to study the material contained in a single Instructional Package.

(2) It took approximately *4 hours* to complete a criterion test.
(3) The average student required approximately *150 hours* to complete the instructional program.

Table 2

Times Required to Study Each Instructional Package and Complete Each Criterion Test

	Instructional Package[a]									
	1	2	3	4	5	6	7	8	9	10
Median time to study instructional material	9:00	8:00	11:30	9:45	14:00	10:00	12:15	11:30	9:30	14:00
Median time to complete criterion test	1:45	2:30	4:15	3:00	6:00	4:00	4:00	4:00	5:00	3:00
Median time to study material and complete test	10:45	10:30	15:45	12:45	20:00	14:00	16:15	15:30	14:30	17:00

[a]Time listed in hours and minutes: 1:45 = 1 hour and 45 minutes.

The time required to study an instructional package can be controlled by varying the number and complexity of the practical exercises. Originally it had been estimated that it would take an average of 10 hours to complete each Instructional Package. The results show that it takes approximately 15 hours. As of this writing there seems to be no easy way of reducing the time required to study the program without at the same time reducing the quality of the program.

The length of training programs can most readily be reduced, without causing undue harm, by eliminating portions of the program which are judged to be "nice to know" rather than "need to know." With respect to the present program, those sections of material describing the systems of the body might be judged by some to be unnecessary to the job of a tumor registrar. There is no question but that a knowledge of systems of the body, especially the anatomy of these systems, can be of considerable value to a tumor registrar, but it is probable that a tumor registrar can perform to minimum standards without this information.

Judged Success of the Training Program

This program was satisfactorily completed by 31 students who were judged to be typical of those persons for whom the program was developed. The program as it exists currently is judged to be effective; it can teach persons with little or no medical training how to abstract the medical chart of a cancer patient.

However, the criterion test scores and the comments of the students indicated that the program contained two major flaws in need of correction. These were:

(1) The training charts were very difficult to read (in the final program they would have to be re-written so that legible copies could be produced).
(2) Training Chart #6, the chart used for criterion test 3 and 10, is very difficult and confusing. This led to the low scores on these two criterion tests. (In the final program two simpler charts might be substituted for

Chart #6 in the criterion tests. Chart #6 could be reviewed in the body of the instruction material, and used in the practical exercises of IP-3 and IP-10).

The above actions should improve the criterion test scores for IP-3 and IP-10. However, the time to study and take the test for these two IPs probably will not change significantly.

Chapter 5

GENERAL PROCEDURES FOR REVISING DRAFT TRAINING PROGRAM MATERIAL

The results of the field tryout of the first draft of the training program indicated that the program could be used to train people to perform to minimally acceptable standards. They also showed that the program could be considerably improved by incorporating trainee suggestions and the recommendations of project consultants and program reviewers. Accordingly, the program was revised, using standard procedures; these are straightforward, but time-consuming. They include the following major steps:

(1) Examine the criterion test scores for each major instructional unit to determine whether a high percentage of trainees scored well on the test. If they did, examine each item of the criterion test to determine whether a small number of items were consistently missed by the trainees. If they were:

(a) Compare the test item with the related instructional material. Are the two clearly related? Does the instructional material present all the information required to pass the test item? Might the trainee require more practice in applying the instructional material before taking the test? Do the comments of the trainees, reviewers, consultants suggest that the test item or its associated instructional material is ambiguous?

(b) Answers to the above and related questions can usually point the way to improving the instructional material, the test item, or both. The material should then be reviewed by content experts to determine whether, in their judgment, it has been improved.

(c) Plans should be made to collect and examine test data during the next administration of the training program to determine whether the revised course material leads to higher test scores.

(2) Examine each major instructional unit to see if the criterion scores for that unit are high. If they are not, review all comments, test data, etc., related to that unit to determine its pedagogical faults. Revise the instructional material and test items as appropriate. Remember also, that the original instructional material and test items may be adequate in themselves; consider whether more practical exercise material is needed to supplement them.

(3) Prior to the initial field-test of a program, develop a definition of what constitutes a satisfactory instructional unit. This definition may contain a variety of elements, to include: (a) time required to study the unit; (b) cost of presenting the unit in terms of instructor time, equipment requirements, etc.; (c) the percentage of trainees who pass the criterion test for the unit; and (d) the criterion test score that separates acceptable from unacceptable test performance. A rather common criterion is that 90% of the trainees should obtain a score of 90 or better on each criterion test. Admittedly, this criterion is rather strict. However, after a program has been tested, revised, and retested a number of times most trainees should score very highly on the program criterion tests.

(4) In addition to revising a program in line with student comments and test scores, review and revise the program according to the suggestions of those groups that are to use the program or are interested parties in its use. This very important step in the development of a training program helps to increase the probability that the final program will be acceptable to and adopted by persons and organizations for whom the program is intended.

APPENDICES

Appendix A

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Coding Form

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Figure 1: Histology Report
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III PRACTICAL EXERCISE MATERIAL

Charity Hospital, New Orleans,
Charts 1 and 31 (under separate cover)

IV TUMOR REGISTRAR HANDBOOK

Rationale for the Design and Utilization of
Tumor Registry Abstract Forms 87
Notebook and Divider Pages (under separate cover)

V CRITERION TEST 91

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The Hospital Cancer Registry: Definitions,
Purposes, Values, Operations, and Cost.
American Cancer Society, 1966. (enclosed)

Appendix B

TUMOR REGISTRY ABSTRACT

SECTION II – BIOGRAPHICAL, SOCIAL AND MEDICAL HISTORY

9. Biographical Information

a. _____ Sex (male, female, unk.)

b. _____ Age at Dx, last birthday

c. _____ Date of birth

d. _____ Place of birth (Town, County & State)

e. Race

1. Caucasian
2. Negro
3. Amer. Indian
4. Spanish Amer.
5. Chinese
6. Japanese
7. Other (specify) _____

f. Marital Status

1. Single
2. Married
3. Widow
4. Divorced
5. Separated
6. Unknown

10. Occupational History

a. _____ Major Occupation

b. _____ Secondary Occupation

c. Present Work Status

1. Working normally
2. Semi-retired
3. Retired
4. Disabled
5. Does not apply
6. Unknown

11. Social History

C = Current; P = Previous

No. C/P

1. Alcoholism
2. Birth control pills
3. Exposure: industrial toxins; industrial carcinogens
4. Smoking: a. Cigar b. Cigarette c. Pipe d. Cannabis
5. Previous anticancer drugs
6. Trauma in area of primary tumor
7. Other _____
8. Unknown

Describe: _____

12. Family History of Cancer:

a. Relative:

1. Mother
2. Father
3. Sibling
4. Child
5. Maternal grandparent
6. Paternal grandparent
7. Other (specify) _____
8. None
9. Unknown

b. Site(s) of family cancer:

a. ☐☐☐
b. ☐☐☐

1. Breast
2. Gastrointestina
3. Lung
4. Genitourinary
5. Lymphoma
6. Leukemia
7. Other (specify) _____
8. Unknown

13. Female History

a. Patient is:

1. Pregnant
2. Premenopausal
3. Perimenopausal
4. (Menopause ± 1 yr.)
5. Menopausal, 1-5 yrs.
6. Menopausal, more than 5 yrs.
7. Not Applicable

b. No. of Pregnancies

0 (None), 1, 2, 3, 4

c. No. of Births

5, 6 or more, 7 (Unknown)

14. Referral Source

1. Private Physician
2. Hospital or Clinic (outside)
3. Hospital or Clinic (this institution)
4. Nursing Home
5. Statutory authority
6. Self
7. Other
8. Unknown

If 1, 2, 4, or 5 above, please specify:

_____

Name of physician or institution

_____

Address

15. Was this neoplasm diagnosed before this admission?

1. Yes, this institution
2. Yes, elsewhere
3. No
4. Unknown

If "yes, elsewhere" specify name & address of physician and/or institution

_____

Name of hospital or physician (or unk)

_____

Diagnosis (site and type) and date

_____

Method of diagnosis (use No. 24 categories)

If treatment received, note in item 17

16. Previous Neoplasms

a. Record total number of previous occurrences, this neoplasm:

0, 1, 2, 3, 4, 5, 6 or more, 7 (unknown)

b. Record total number of previous independent cancers:

0, 1, 2, 3, 4, 5, 6 or more, 7 (unknown)

c. Record primary site and type for each previous independent cancer. If unknown, record as unk.

(1) _____

_____

(2) _____

_____

SECTION II – BIOGRAPHICAL, SOCIAL AND MEDICAL HISTORY *(Continued)*

17. Previous Treatment

a. Has patient received tumor-directed treatment for this neoplasm more than 3 months before entry to this institution?

☐ 1. Yes 2. No

b. If yes, check types given and describe briefly

1. Surgery
2. Radiotherapy
3. Chemotherapy
4. Hormones/Steroids
5. Other
6. Unknown

☐ _____

☐ _____

☐ _____

*NOTE: Any treatment given within three (3) months before entry should be indicated on an appropriate treatment summary in Section IV.

SECTION III – MEDICAL INFORMATION, DIAGNOSIS AND PHYSICAL FINDINGS

18. Symptoms

18a. Significant Symptoms. Describe and record date of onset for those symptoms which have occurred within one year prior to admission (PTA).

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

Checklist:

1. Changes in bowel or bladder habits.
2. A sore that does not heal.
3. Unusual bleeding or discharge (presence or absence of).
4. A lump or thickening–breast, elsewhere.
5. Indigestion or difficulty swallowing.
6. Obvious changes in a wart or mole.
7. Persistent hoarseness, cough, sore throat.
8. Weakness or fatigue, fainting spells.
9. Unexplained weight loss or gain.
10. Breathing difficulties, shortness of breath.
11. Other symptoms (define).
12. No significant symptoms.
13. Information unavailable.

18b. General Symptoms. Describe and record date of onset for those symptoms which originated within three (3) months PTA.

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

Checklist:

1. None
2. Angina pectoris
3. Acromegaly
4. Anorexia
5. Chills
6. Cough
7. Diarrhea
8. Dysphagia
9. Dyspnea
10. Dysuria
11. Endocrine effect
12. Fever
13. Headache
14. Hematuria
15. Hematemesis
16. Hemoptysis
17. Hemorrhage
18. Hirsutism
19. Hoarseness
20. Lactation
21. Melena
22. Nausea &/or vomiting
23. Night Sweats
24. Nocturia
25. Orthopnea
26. Pain
27. Pruritus (itching)
28. Petechia
29. Skin nodules
30. Sore throat
31. Syncope
32. Urinary frequency
33. Urinary irritation
34. Urinary obstruction
35. Urinary urgency
36. Vaginal bleeding
37. Weakness, fatigue
38. Weight gain
39. Weight loss
40. Other (specify)
41. Unknown

18c. Neurological Symptoms: Describe and record date of onset for those symptoms which originated one year PTA.

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

☐☐ _____

Checklist:

1. No neurologic symptoms
2. Abnormal coordination
3. Abnormal gait
4. Memory deficit
5. Motor weakness
6. Seizures
7. Sensory change
8. Abnormal speech
9. Visual defect
10. Other (specify)
11. Unknown

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